

Filling Out the Display Dictionary Class

The classes in this dictionary define the appropriate way to draw or otherwise display array-type data objects in order to be able to correctly interpret geometric or other quantities referenced to, e.g., an image elsewhere in the label.

For a video walkthrough of filling out a basic Display Settings class, watch this video:

[Filling Out the Display Settings Video](#)

To follow along, use these XML documents and this FITS file:

[Display Settings XML](#)

[Display Settings XML \(empty\)](#)

[Display Settings FITS](#)

These descriptions are current for the 1.5.0.0 and 1.6.0.0 releases of the Display Discipline Dictionary.

<Display_Settings>

REQUIRED

This is the main wrapper class for the Display Dictionary. It must be used whenever you want or need to include display information in any label that includes one or more array-type objects, in which case it is repeated for each object that needs display information.

Note: An earlier version of the PDS4 Information Model allowed data preparers to include a *Display_2D_Image* class at the end of an *Array_2D_Image* class. This has been superseded by the Display Discipline Dictionary classes described below. *Do not use* the old *Display_2D_Image* class in your labels.

<Local_Internal_Reference>

REQUIRED

This class is used to identify the specific array-type object to which these display settings apply. Note that, while the class name *Local_Internal_Reference* is in the Display Dictionary namespace, the attributes within it all come from the PDS core namespace. You will need to specify the change in namespace. This can get rather complicated, depending on how you've set up your label to reference different namespaces. See the [Using Local Dictionaries](#) page for details on that. For the purposes of this description, we'll indicate the attributes in the PDS core namespace by adding an explicit "pds:" namespace abbreviation prefix to them.

<pds:comment>

OPTIONAL

This is a free-text field for any clarifying comments you might wish to include.

<pds:local_identifier_reference>

REQUIRED

This attribute identifies the array object to which the display settings apply, by citing the *local_identifier* value from the associated array object. All array-type objects have an optional *<local_identifier>* attribute, which, when present, must have a value that is unique within the label. You must assign *local_identifier* values to your arrays when you are providing display information.

<pds:local_reference_type>

REQUIRED

This must have the value *display_settings_to_array*.

<Display_Direction>

REQUIRED

This class defines the correct orientation for displaying the array axes associated with a single image plane (that is, the *Line* and *Sample* axes).

<comment>

OPTIONAL

Another opportunity for free-format comments.

<horizontal_display_axis>

REQUIRED

This attribute identifies which axis of the array is considered the horizontal (or "sample") axis by referencing the *<axis_name>* value. The value *must* match the name exactly (i.e., case counts).

<horizontal_display_direction>

REQUIRED

This attribute indicates the direction in which pixels should be drawn sequentially along the horizontal axis of the display device. It must have one of these two values (case and embedded blanks are significant):

- **Left to Right**
- **Right to Left**

<vertical_display_axis>

REQUIRED

This attribute identifies which axis of the array is considered the vertical (or "line") axis by reference the *<axis_name>* value. The value *must* match the name exactly (i.e., case counts).

<vertical_display_direction>

REQUIRED

This attribute indicates the direction in which lines of pixels should be stacked sequentially along the vertical direction of the display device. It must have one of these two values (case and embedded blanks are significant):

- **Top to Bottom**

- **Bottom to Top**

<Color_Display_Settings>

OPTIONAL

Use this class if your array object is an RGB color image, or a banded image for which you would like to define a default set of channels to be interpreted as RGB levels.

<color_display_axis>

REQUIRED

The value of this attribute must correspond to the <axis_name> value of one of the axes of the relevant array-type object. This is the axis that will be considered the "color" or "band" axis. Logically, it must *not* be the same value as found in either the <horizontal_display_axis> or <vertical_display_axis> of the <Display_Direction> class (although as of this writing this is not validated).

<comment>

OPTIONAL

Free-format text for additional notes to users.

<red_channel_band>

REQUIRED

This attribute is the subscript to be used in the named *color_display_axis* for the red (R) value. **Note** that the first element along this axis is considered to have a subscript of 1 (one).

<green_channel_band>

REQUIRED

This attribute is the subscript to be used in the named *color_display_axis* for the green (G) value. **Note** that the first element along this axis is considered to have a subscript of 1 (one).

<blue_channel_band>

REQUIRED

This attribute is the subscript to be used in the named *color_display_axis* for the blue (B) value. **Note** that the first element along this axis is considered to have a subscript of 1 (one).

<Movie_Display_Settings>

OPTIONAL

Use this class to define a time axis and parameters for displaying the associated array object as a movie.

<time_display_axis>

REQUIRED

The value of this attribute must correspond to the *<axis-name>* value of one of the axes of the relevant array-type object. This is the axis that will be considered the "time" axis. Logically, it must *not* be the same value as found in either the *<horizontal_display_axis>* or *<vertical_display_axis>* of the *<Display_Direction>* class (although as of this writing this is not validated).

<comment>

OPTIONAL

Free-format text for additional notes to the user.

<frame_rate>

OPTIONAL

This attribute indicates how many images (i.e, "frames") should be displayed each second. You must specify a unit of "frames/s". For example:

```
<frame_rate unit="frames/s">12</frame_rate>
```

The minimum valid value for this attribute is 1.0.

<loop_flag>

OPTIONAL

This attribute will contain the value *true* if the movie should be looped, or *false* if not.

<loop_count>

OPTIONAL

This attribute contains the number of times the movie should be looped before being stopped. It may have a minimum value of one (1).

<loop_delay>

OPTIONAL

This attribute gives the amount of time to pause between playback loops. You must include a time unit with the value, e.g.:

```
<loop_delay unit="ms">500</loop_delay>
```

This may have a minimum value of zero (0).

<loop_back_and_forth_flag>

OPTIONAL

This attribute will contain the value *true* if the movie should be played alternately forward and in reverse while looping; or *false* if it should only be played in the forward direction when looping. **Note** that this attribute only makes logical sense in the presence of other looping attributes, but as of this writing this is neither required nor validated.